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bcc
Subject bkgd for Ra vs gamma

Just to clarify for you:

- gamma measurements, that we display in microrem/hour [uR/hr] measures all gamma rays emitted from natural or technically enhanced natural sources:

e.g. over yard: no known contamination: measures K-40, Uranium, Thorium, Radium gamma isotopes in the soil/yard, so in Fl yards, the ~ 6uR/hr, is measuring ~ 4-5 uR/hr from the ground, and ~1-2 uR/hr from atmosphere or cosmic gamma rays. Ra-226 naturally contributes a significant majority of that 4-5 uR/hr bkgd level.
{note: the helicopter, and ground surveys can narrow what gamma rays we want to see, i.e. the Bi-214 that indirectly gives us the Ra-226 values}

- if over driveway, or asphalt, or other human built structure, could contain TENORM or elevated U, or Th, or Ra over what is naturally in soil beneath it, so for e.g. over a concrete driveway, the 6 uR/hr might go to 8-9 uR/hr or higher, depending on where the concrete or asphalt was made.
- and variability in bkgd is much more prominent when you are over areas of more natural minerals, such as piedmont areas of Ga, western areas, etc., just depends on geology, and most all geologic chemistry is well known for radionuclides and metals across country. U.S. avgs ~5 to ~20 uR/hr over most natural soil, which again has larger % of cosmic radiation the higher you go, like Denver.
- so, for any given site, we still measure bkgd levels to confirm our prior knowledge presumed for a given area, i.e. for most of FL, with low sea level, few natural minerals, we have our own survey data and FIPR to confirm that ~6 uR/hr should be consistent bkgd except where phosphate has been left on the surface, 12 in or so.
- the conc'ns of Radium-226, our main radionuclide or isotope of concern, is about 0.9 to 1.0 pCi/g in bkgd from our sampling so far. U.S. range is 0.2 to 4.0 pCi/g in natural soil.
- thus for FL any Ra measured in pCi/g that is over 2-3 pCi/g would be due to phosphate, and levels tend to range 20-50 pCi/g in these areas.

Jon

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